

processing circuit;

a display circuit adapted to display the signal from said
signal processing circuit; and

a radiation source adapted to generate radiation.

63. (New) An apparatus according to Claim 51, wherein said scan
circuit comprises a shift register.

64. (New) An apparatus according to Claim 63, wherein the shift
register is of static type.

65. (New) An apparatus according to Claim 51, wherein said scan
circuit comprises a decoder. - -

REMARKS

Claims 1, 4-6, 10-12, 15, 16, 22-30, 39, 40, 44 and 46-65 are now presented
for examination. Claims 1, 10-12, 16, 22-27, 30, 39, 40 and 44 have been amended to
define still more clearly what Applicants regard as their invention. Claims 2, 3, 7-9, 13,
14, 17-21, 31-38, 41-43 and 45 have been cancelled without prejudice. Claims 51-65 have
been added to provide Applicants with a more complete scope of protection.

Claims 1, 16, 27, 46 and 51-54 are the independent claims.

Applicants note with appreciation the allowance of Claims 46, 48 and 50.

Initially, Applicants do not understand the statement in the Office Action concerning the references mentioned in the specification. Each of those references was properly cited in an Information Disclosure Statement, and in fact, the Office Action included initialed copies of the PTO-1449 forms indicating that the references were considered by the Examiner. An explanation is requested.

Claims 1-15, 18-21, 23 and 28-45 were rejected under 35 U.S.C. § 112, second paragraph, as indefinite. First, cancellation of Claims 2, 3, 7-9, 13, 14, 17-21, 31-38, 41-43 and 45 renders the rejections of those claims moot.

The other claims have been carefully reviewed and amended as deemed necessary to ensure that they conform fully to the requirements of Section 112, second paragraph, with special attention to the points raised in the Office Action. It is believed that the rejection under Section 112, second paragraph, has been obviated, and its withdrawal is therefore respectfully requested.

Claims 1-4, 6, 13, 16, 17 and 27 were rejected under 35 U.S.C. § 102(b) as anticipated by Orava. Claim 5 was rejected under 35 U.S.C. § 103 as obvious from Orava in view of Ichikawa. Claims 15, 18, 22 and 30 were rejected under 35 U.S.C. § 103 as obvious from Orava. Claims 23-26, 47 and 49 were rejected under 35 U.S.C. § 103 as obvious from Orava in view of Sayed. Claims 28, 29, 39 and 44 were rejected under 35 U.S.C. § 103 as obvious from Orava in view of Polischuk. Cancellation of Claims 2, 3, 7-9, 13, 14, 17-21, 31-38, 41-43 and 45 renders their rejections moot.

Independent Claims 1, 16 and 27 have been amended to more clearly recite that an image pickup apparatus of the present invention comprises a plurality of image pickup elements each including a plurality of pixels arranged two-dimensionally, and is arranged so that a scan circuit (Claim 1), a plurality of transfer switches (Claim 16) or a

protection circuit (Claim 27) is arranged between two photoelectric conversion units of the pixels included in the same image pickup element and is not arranged between the photoelectric conversion units arranged respectively at end portions of two image pickup elements adjacent to each other. New independent claims 51-54 recite the similar feature of the present invention (see Fig. 9, for example). This feature of the present invention is not taught or suggested by the cited reference Orava.

Orava, as understood, shows a radiation image sensing apparatus in which a plurality of photoelectric conversion cells are arranged adjacently to each other (Fig. 5). Orava suggests that control electronics is preferably implemented on a substrate at a periphery of an image array formed with a pixel array (column 16, lines 10-13; column 20, lines 22-31; column 21, lines 21-31), and is silent as to a concrete structure. However, this, it is submitted, is distinguishable from the invention defined in the independent claims in which such the electronics is arranged between photoelectric conversion units arranged two-dimensionally in the same cell but not arranged between the photoelectric conversion units arranged respectively at end portions of two cells adjacent to each other.

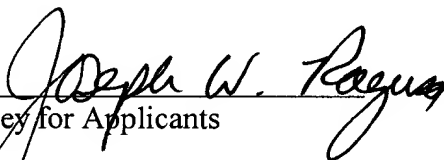
A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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MARKED-UP VERSION SHOWING THE CHANGES MADE TO THE CLAIMS

1. (Amended) An image pickup apparatus comprising:

[an] a plurality of image pickup [region where] elements which are formed on a same semiconductor substrate,

wherein each of said plurality of image pickup elements includes a plurality of pixels which include photoelectric conversion units respectively and are arranged two-dimensionally, and a scan circuit which supplies a common read-out pulse sequentially to a plurality of pixels arranged in a first direction, [to pick up an object image by dividing the object image into a plurality of regions;] and

wherein said [a] scan circuit is arranged between [said plurality of] two photoelectric conversion units included in [said] the same image pickup elements [region to commonly process the plurality of pixels] and is not arranged between the photoelectric conversion units arranged respectively at end portions of two image pickup elements adjacent to each other.

2. (Cancelled)

3. (Cancelled)

7. (Cancelled)

8. (Cancelled)

9. (Cancelled)

10. (Amended) An apparatus according to claim [1] 52, wherein said scan circuit comprises vertical and horizontal scan circuits, and the vertical scan circuit is bent so as not to cross the horizontal scan circuit.

11. (Amended) An apparatus according to claim [1] 52, wherein said scan circuit comprises vertical and horizontal scan circuits, and the horizontal scan circuit is bent so as not to cross the vertical scan circuit.

12. (Amended) An apparatus according to claim 1, wherein said scan circuit is [provided on] arranged along a plurality of [rows or columns basis in a column or row direction] photoelectric conversion units arranged in a second direction, different from the first direction.

13. (Cancelled)

14. (Cancelled)

16. (Amended) An image pickup apparatus comprising:

[an] a plurality of image pickup [region where] elements which are formed on a same semiconductor substrate,

wherein each of said plurality of image pickup elements includes a plurality of pixels which include photoelectric conversion units respectively and are arranged two-dimensionally, and a plurality of transfer switches which transfer signals from said plurality of pixels sequentially to a common output line, [to pick up an object image by dividing the object image into a plurality of regions; and

a common processing circuit arranged between the plurality of photoelectric conversion units in said image pickup region to selectively transfer, to a horizontal output line, signals from a vertical output line to which signals from a plurality of pixels in a vertical direction are read] and

wherein each of said plurality of transfer switches is arranged between two photoelectric conversion units included in the same image pickup element and is not arranged between the photoelectric conversion units arranged respectively at end portions of two image pickup elements adjacent to each other.

17. (Cancelled)

18. (Cancelled)

19. (Cancelled)

20. (Cancelled)

21. (Cancelled)

22. (Amended) An apparatus according to claim 16, wherein an electric power supply line is arranged on said [common processing circuit] plurality of transfer switches.

23. (Amended) An apparatus according to claim 1, further comprising a scintillator plate and fiber optic plate provided in front of [the] said plurality of image pickup [region] elements.

24. (Amended) An apparatus according to claim 16, further comprising a scintillator plate and fiber optic plate provided in front of said plurality of image pickup [region] elements.

25. (Amended) An apparatus according to claim 23, further comprising:
a signal processing circuit adapted to process [a signal] signals from
said plurality of image pickup [region] elements;
a recording circuit adapted to record a signal from said signal
processing circuit;

a display circuit adapted to display the signal from said signal processing circuit; and
a radiation source adapted to generate radiation.

26. (Amended) An apparatus according to claim 24, further comprising:
a signal processing circuit adapted to process [a signal] signals from said plurality of image pickup [region] elements;
a recording circuit adapted to record a signal from said signal processing circuit;
a display circuit adapted to display the signal from said signal processing circuit; and
a radiation source adapted to generate radiation.

27. (Amended) An image pickup apparatus comprising:
[an] a plurality of image pickup [region where] elements which are formed on a same semiconductor substrate,
wherein each of said plurality of image pickup elements includes a plurality of pixels which include photoelectric conversion units respectively and are arranged two-dimensionally, and a protection circuit, [to pick up an object image by dividing the object image into a plurality of regions;] and
wherein said [an external terminal or/and] protection circuit is arranged between [the plurality of] two photoelectric conversion units included in [said]

the same image pickup [region] element and is not arranged between the photoelectric conversion units arranged respectively at end portions of two image pickup elements adjacent to each other.

30. (Amended) An apparatus according to claim [27] 53, wherein said external terminal has a bump.

31. (Cancelled)

32. (Cancelled)

33. (Cancelled)

34. (Cancelled)

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (Amended) An apparatus according to claim [27] 54, wherein said external terminal and said protection circuit are arranged side by side.

40. (Amended) An apparatus according to claim [27] 54, wherein said external terminal and said protection circuit overlap each other.

41. (Cancelled)

42. (Cancelled)

43. (Cancelled)

44. (Amended) An apparatus according to claim [27] 54, wherein a protection resistor is interposed between said external terminal and said protection circuit.

45. (Cancelled)